A STUDY OF THE E & A FUNCTION & ORGANIZATION IN REGIONS & DISTRICTS

Indian & Inuit Affairs Program

C.J. Crapper P.Eng.

Indian and Northern Affairs
Affaires indiennes et du Nord

Engineering and Architecture
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REPORT
For Discussion Only

RAPPORT
Pour discussion seulement

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EXECUTIVE SUMMARY WITH RECOMMENDATIONS

General Observations and Recommendations

1) In the past few years, there has been considerable operational change in the Region and District role of planning and implementing capital and maintenance programs. Continuing internal and external influences on Program delivery point towards further significant changes over the next few years.

   A strategy for change is required. Adjustment to the changing environment should be considered on both a short term and longer term basis.

   E&A attitudes and organization structures must be flexible, recognizing a diversity of aspirations and needs of client groups.

2) Present trends and influences for change, are transforming the E&A role from that of "doers" to "manager", requiring individuals to be generalists rather than specialists. There is an emphasis on greater front-end involvement in areas such as planning, technical feasibility, technical systems and training. Evaluation should be carried out to provide a feed-back to the front-end activities.

3) Recent budget constraints, new management systems and contribution arrangements with accountability are, in the short term, having a significant impact on increasing the workload of E & A units.

   Although increased E & A resources are required over the short term, improved management systems, increased Band technical training, and a successful Vote 15 endeavor, should reverse the workload implication within a few years.

4) Regional E & A units are service organizations and where work demand exceeds manpower resources, it is important that clear and well understood priorities and levels of E & A services, be established.

Optimum use should be made of private consultants and central service agencies such as DPW in the planning and implementation of new capital facilities. This of course should recognize that the employ of consultants is not very adaptable to maintenance projects and to the smaller projects where consultants' costs are out of proportion to the construction costs.

If contracting work to outside consultants will help to achieve Program goals, a short period of cost inefficiency might be justified if quality is kept to a reasonable level.

5) To counteract the natural tendency for workload to expand to absorb available manpower resources; it is suggested that Program E & A units avoid the image of being a free service.

6) If Vote 15 is to be successful with respect to the planning and implementation of construction projects, there must be a technological transfer as well as a dollar transfer to Bands. Over the past number of years, the Program has carried out considerable Band training in Education, Economic Development, Local Government etc., but very little technical training in project planning and construction management - other than limited trade skill training. Technical training in the practices and procedures followed in the construction industry, is essential.

Specific Observations - Alberta

1) Of the total of about 20 million dollars in capital construction in Alberta, approximately 12 million has been transferred to Bands by contribution arrangement. Approximately 6 of this is housing.

   A major portion of capital construction projects, except education facilities, has been identified in Vote 15 but with little apparent consideration given to the Bands ability or desire to manage and carry out the implementation process. To a large extent, community improvement dollars are transferred to Bands but the workload to carry out the implementation work remains with Program E&A staff. In some cases, these projects are a greater workload for E&A staff than if they were Vote 10 projects.

   Some Indian Bands demand what they think is a free service from Program E & A staff, rather than spend capital funds on consultants.

2) The requirement for technical services varies considerably within the region, depending upon the degree of independence that individual Bands have in technical matters. Of the 42 Bands in Alberta, it is estimated that only 5 have demonstrated a willingness and the technical capability of taking on capital projects with no operational help from Program E&A. It is estimated that another 15 have the capability but feel that they should not pay for engineering services from their capital monies or, that engineering input is not necessary.

   Approximately 15 other Bands, with a good training program, should be able to take over much of the technical implementation role within a few years. There are another 7 Bands who require considerably more organization ability, skill and knowledge and full Program E&A support will be required for a number of years.

3) From discussion with senior Program officers in the Region it was clear that they recognized and supported the need for a strong technical

capability. In the short term, they agreed that considerable technical support should be given to Bands with a particular emphasis on training. At the same time however, they want an orderly withdrawal from Program E&A support to Vote 15 projects, as Bands are ready for it.

4) The Director, E&A is a member of the senior management team in the Region and appears to have an excellent working relationship with his colleagues in Finance, Contract Admin., and Education etc. Project control systems and technical procedures are effective and well understood in Alberta. For 1979/80, Project Managers have been named and technical standards have been systematically established for capital contribution arrangements.

5) The housing subsidy program in Alberta is in the order of 6 million dollars per year. Approximately 8 E&A man-years are spent in technical services to Bands in support of their housing programs. This represents approximately 1 man-year for every 64 housing units constructed. Although regional management do not want a highly visible role in housing they have recognized the need for E&A input so as to achieve a reasonable level of quality.

6) At the time of the study, there were 59 man-years approved to carry out the E&A activities in the Alberta Region. Fifty-three of these positions were filled. The 1979/80 E&A workplan in Alberta identifies the need for 60 man-years and a theoretical calculation using engineering and architectural resource standards identifies the need for 62 man-years to carry out the role and responsibilities of E&A units as presently prescribed.

   In Alberta, maintenance work carried out by Program E&A staff is about 33% of the total E&A workload. Maintenance plus housing consumes about 46% of the total E&A resources in the Region, leaving approximately 54% of the Program E&A manpower (both Regional office and Districts) to carry out the core function plus most of the operational technical function.

Specific Recommendations - Alberta

1) E & A Units in the Alberta region are understaffed to fully carry out their workload and provide the level of technical services being demanded of them.

   With the present workload and with the foreseeable workload of the next two or three years, it is recommended that the full approved complement of 59 man-years be staffed.

2) It is recommended that a clear and well understood position be taken by the Program in the Region as to the extent and level of E & A services to be provided for projects that are transferred to Bands through contribution arrangements. A reduction in Program E & A staff should only occur with a de facto transfer of the technical workload to Bands.

3) It is recommended that the transfer of technical man-years to Tribal Councils be conditional on their willingness and ability to assume the technical role and responsibility. If the technical workload is to remain with Program E & A, so should the manpower.

4) This study supports the opinion of the Director, E & A in Alberta that consideration should be given to establising District Engineers in Lethbridge and in High Level to serve the Fort Vermillion District. If this is done, a strong functional relationship between these District engineers and the Regional Office E & A Unit, is recommended.

5) It is recommended that particular emphasis be given to Band technical training so that they acquire the skill and knowledge necessary to administer and manage their own capital programs.

6) It is recommended that a strategy for change be developed. This should include a short term and a long term plan, and account for:

   a) A technological transfer to Bands as well as a transfer of dollars;

b) A changing role for E & A staff with an initial heavy role in project implementation work but a greatly diminished role in that activity within a few years;

c) Maintaining a high level of E & A technical competance through a role transaction and a manpower reduction;

d) Flexibility in organization structure;

e) Recognizing the costs and benefits of technical change in relation to the real objectives of the Program.

PREFACE

This report recognizes differences in the nature and size of the technical workload and differences in the operation and delivery system in each Region. It is written therefore with a General main body, and an annex which is specific to each region to deal with these differences. The terms of reference and a statement of the E&A function are attached as Appendix "A".

PURPOSE

This report studies the function and organization of Region and District E&A Units in view of trends and influences which are introducing changes in E&A activities, roles and responsibilities. It discusses the impacts of these trends and the need for a strategy for change to achieve a smooth transition to an altered role.

TERMS OF REFERENCE (See Appendix "A")

REGIONAL VARIANCES

Regions differ in geography, nature of projects, size of the capital program, Indian needs and objectives and, to some extent, program management style. Organization development is a continuing process and a variety of approaches have been used in an attempt to achieve greater Indian involvement and local control by Indian Government. With this, the role and activities of Regional and District E&A units change and are assigned differently among Regions, Districts and Bands.

Technical organization must respect the structure of the Program Delivery machinery. There are three variations of technical support:

(a) Technical staff in Regional offices who provide functional direction to District staff, with District professional staff reporting to Program District Managers:

(b) Technical staff on strength in Regional offices and District offices with Area professional engineers being located geographically convenient to serve and provide functional direction to one or more Districts. District Technical staff are trade skill specialists, maintenance craftsmen and technologists. Area Engineers receive direction from the Director, E&A; and

(c) Program technical staff on strength of the Regional office and providing support to Indian Bands and Band organizations through Service Centres.

MANAGING FOR CHANGE

In the past year or two, there has been considerable operational change in the Region and District role of planning and implementing capital and maintenance programs. The continuing influences on Program delivery point towards further significant changes over the next few years with the largest impact occurring within the next year or two. It is important therefore to develop an overall strategy to accommodate these changes.

The influences for change are identifiable and some of the changes are obvious, predictable and inevitable. Others however are more subtle and will depend on Indian decisions and on policy decisions taken within the Indian and Inuit Affairs Program. A framework for considering the overall long term changes should be developed within which, planning and organizational adjustment activities can allow a smooth transition.

The following discusses how the trends and factors influencing change will impact on the role, responsibilities, skills, attitude requirements and manpower needs of E&A units in Regions and Districts.

Trends	Impacts
1) Budget and manpower constraints	- increased pressure to improve productivity and obtain better investment value. - "resource-conscious" management style. - greater use of consultants. - more conscious decisions about workload priorities and the level of technical service to Bands.

The capital and maintenance budget has doubled over the past 5 years, and even though inflation has consumed a large portion of the increase, the remainder constitutes a large increase in buying power and technical workload. With this, there has not been a proportionate increase in E & A manpower strength. Indian Bands are inclined to demand what they think is a free E&A service provided by Program staff, rather than use their capital funds to hire consultants.

	Trends	Impacts
2)	Use of private enterprise consultants and central service agencies such as D.P.W.	- Shift of E&A role from "doers" to evaluator, technical manager and adviser. - Short periods of cost inefficiency, which is warranted if it will help to achieve I&I development goals. - Demand for Indian Band training.

For the past several years, the Federal Government make-or-buy policy has strongly favoured where it is practical, the purchase of technical services from the private sector. This policy as well as the general pressure to maintain existing manpower levels suggests that program E & A units and/or Indian Bands should purchase as much from the private sector as can be justified on a cost effectiveness basis.

Much of capital works and facilities maintenance of the Indian and Inuit Program are not readily adaptable to privatization because many of its projects are small and remote, making consultants' costs prohibitively high.

Trends	Impacts
3) Better management and greater accountability.	- Accountability insists that roles and responsibilities be set out clearly and fully understood by all those involved.
- improved capital management system;	- a project management style of operation appears warranted and a more formal and regularized decision making process is demanded.
- B.C.S. and new Financial Directives;	
- introduction to Treasury Board's concept of project management;	- realignment of organizational structure may be needed.
- the Treasury Board's requirement for quality and level of service standards;	- the degree of accountability must be defined.
- new Treasury Board Circulars concerning capital management and contributions;	- An increased workload with a reduced impact after new systems and procedures are operating efficiently.
- the evaluation program;	
- the importance given to life-cycle costing as compared with initial investment cost.	- Better cost estimating.

The Director E & A in each region is responsible and accountable for the technical implementation of all capital projects in the regional capital plan. This accountability is not intended to subtract from the established responsibility and accountability of the Program Responsibility Centre Manager. Also, it is not intended that the E & A responsibility and accountability substract from or interfere with the responsibility and authority of the Band in their carrying out of projects under contribution agreements.

E & A in its participation in the development of contribution agreements for capital and facilities maintenance must clearly know the extent to which the Department - and E & A as the Departments representative in technical matters - will remain accountable for effective use of appropriated funds.

Numerous systems and procedures being introduced as a matter of management improvement and greater accountability. One of these is a capital assets inventory and a maintenance management system. This will have a significant impact on E & A resource requirements.

Another management improvement item is the decentralization of writing Treasury Board Submissions which is an added workload to regional E & A staff.

The implementation of the Project Control System will require additional manpower over the course of the next 12 to 18 months. Experience with other project delivery systems indicates that even after they are fully operative, the manpower requirements for a given project will be slightly higher than under the old ad hoc system. The increase in manpower costs is more than justified, however, by the increased effectiveness and accountability which the project control system should bring with it.

Trends	Impacts
4) Contribution arrangements	- E&A organizations will have to participate actively in the transfer of capital and maintenance works to Bands. - The need for technological training of Bands. (Technological transfer) - with funds transferred to Bands there will be an increased E&A workload until Bands develop

the needed knowledge and skills to plan and implement their own projects. In the long run there should be a significant decrease.

- If contribution arrangements are to require some level of accountability, this will be an additional E&A workload as compared to some previous arrangements that required no accountability.

- Previously, C.M.H.C. inspected Indian house construction that they financed. Under new arrangements, they will not provide this service and if it is to be done, it will be by E&A staff thereby increasing workload.

- A general strategy for moving from a design and construction role to technical analysis and evaluation.

The transfer of funds to Indian Bands for the acquisition and maintenance of physical facilities started several years ago, largely in the housing program. Although E & A staff (particularly District technical staff) have in the past provided an advisory service and a support role to Bands in contribution arrangements, it has been to varying degrees of intensity. E & A involvement has been limited and E & A staff has not been expected (in many cases) to be answerable and accountable for quality, effectiveness and efficiency of these projects.

The very significant shift in role brought about by contribution agreements will call for E & A regional staff who have the personal capacities and imagination to cope with uncertainty and change. Their management style must cope effectively with experimentation, risk taking and dealing with crises which will undoubtedly accompany the transfer process. At the same time, they must stay technically objective and be supported in this by senior program management. When safety is not compromised, E & A staff must also respect that decisions might be ultimately made that are contrary to technical logic, but for sound administrative management reasons or political expediency.

It is expected that the transfer of all activities in project implementation and maintenance management to Bands will be a somewhat gradual process with many Bands not wishing to assume full responsibility for all the implementation activities for a few years.

The 1979 transfer of appropriated funds under vote 15 - has started in some regions but it is not clear as to how or to what extent the transfer of responsibilities will take place. The program E & A units residual workload is not clear as some Bands wish to have the funds and the ultimate decision making authority transferred to them but expect E & A staff to continue carrying out the major work activities.

Bands are at various points along a continuum of readiness to accept project implementation responsibility. There are those who, with the assistance of consultants, are sufficiently experienced and knowledgeable to successfully carry out their own capital and maintenance program. The program E & A activities would be limited to the Regional core role. This would include dealing with project proposals, technical terms and conditions and evaluations necessary for project progress claims and confirming that overall technical objectives are being reached.

At the other end of the continuum of readiness, are those Bands (usually remote areas) that are not yet prepared, and not willing to take on the responsibility of planning, designing and constructing the more sophisticated physical facilities on their

Reserves. Departmental E & A staff will need to continue their direct role in carrying out these projects.

If contribution arrangements are to be successful, the Department will need to make a fundamental investment in technologial transfer. E & A units will have to develop a systematic approach to ensuring that the requisite capabilities are in place within the Indian Bands and the private sector which will serve those Bands.

Vote 15 and the transfer - with accountability - of capital and maintenance funds to Bands, should ultimately reduce the E & A workload substantially leaving only the core role to be performed by Program E & A staff. During the transition period however, there will be an increase in E & A workload due to contribution arrangements and new management systems. Again, this technical role should not be in competition with engineering and architectural services that can reasonably be purchased from consultants.

Figure 1 attempts to graphically show the impact that an increased budget, contributions to Bands and improved management systems will have on technical manpower needs.

E&A RESOURCE GUIDELINES

(Reference-Report EA-HQ-78-152)

Private enterprise in the engineering and architectural consulting business, as well as contractors in construction, depend extensively on records and manpower resource measurements to forecast the manpower cost of ongoing and future work. These measurements provide a quantitative method of determining manpower demands given changes in volume and type of business, and usually have a direct bearing on profit and loss. As Government is service oriented a similar degree of accuracy may not be as necessary, but even so, its investment decisions would profit from some structured method of relating its workload to manpower needs.

Last year, the Engineering and Architecture Branch set out to establish guidelines to assist in forecasting regional E & A manpower requirements. To determine and qualify the input of regional E & A staff, study teams visited five regions in the Indian and Inuit Affairs Program.

In brief, the analysis allowed the determination of input quantity of the various disciplines into the various types of work when carried out in-shop by Program employees or when carried out by consultants. The tables and formula produced from the E & A Branch 1977/78 study allow the computation of the amounts and type of technical resource needed to carry out a capital program of known types of facilities. The results of the study have been discussed with resource management consultants who agree that they relate reasonably well with figures used in private enterprise and are useful guidelines in our evaluation of technical resource needs in the I & I Program. These figures do, however, represent the manpower resources as they existed for the level of service currently being provided, rather than the manpower needed for an optimum level of service.

Since the 1977/78 manpower utilization study the factors and tables used in computing the resource requirements have been modified in an attempt to account for the 1979/80 situation and have been adjusted in an attempt to account for a part of the capital and maintenance project work being transferred to Bands. Although the E & A function in each region may be similar, role and E & A activities in each region are somewhat different. It follows then that the resource guidelines produced are only that - a guideline and indicator of manpower needs.

CAPITAL MAN-YEARS AND E & A BRANCH ASSISTANCE

Contribution arrangements and new management systems and procedures are increasing E & A workload and this situation is likely to continue for two or three years. The workload diagram (Fig. I) shows the anticipated manpower requirement in relation to the existing manpower resources in regions and, as a factor of an increasing contribution arrangement activity. The difference between the anticipated workload and the

present available resources can be reconciled by increasing the number of C.F.T. positions; utilizing capital man-years; obtaining direct assistance from the E & A Branch and, by deleting some of the E & A responsibilities. It appears that the use of capital man-years and E & A Branch assistance are the most likely solutions under the present environment of resource restraint.

In 1978/79 the Indian and Inuit Affairs Program had 326 Capital (term) man-years, of which only 125 were utilized. Many of the 125 were used in capital construction activities some of which were term engineers and architects engaged on particular projects. The use of capital man-years (term) allows the term or short period employment of an engineer, architect, technologist, tradesmen or labourer on specific capital projects with wages and other expenses chargeable to the capital cost of the project. This avoids personal service contract arrangements and a master-servant relationship which is contrary to T.B. regulations.

The Engineering and Architecture Branch has established a pool of engineers and architects particularly chosen to provide a direct support to Regional E & A managers as needed. Individuals in this group represent a wide range of specialty and discipline and betwen regional assignment are dispersed throughout the Branch to operate within their area of expertise. They are available for short or longer term periods of time of Regions on an individual assignment basis and to assist in peak load or special situations. This should make up much of the manpower required to equate E & A manpower to work demand.

E & A RESPONSIBILITIES VIS-A-VIS BAND PROJECTS

(This section of the report refers to Band projects such as housing, Band halls, and arenas, etc., which are not necessarily funded from appropriations and, to the maintenance of Band operated schools.)

General

On all but Indian lands in Canada, the development and operation of physical facilities are controlled by Federal, Provincial and Municipal codes, standards and regulations that deal with safety, health, and the environment etc. Most of these affect cost and level of service and therefore impact on the type and quality of facility. In most communities, regulations of financial institutions such as lending companies and C.M.H.C. have a considerable impact on the quality and quantity of physical facilities. This type of regulation is usually designed to protect the investor and promote wise investment practices. These types of control do not generally apply as a matter of course, on Indian Reserves. The application of equivalent regulations, generally only apply by choice of the Department or by choice of the Indian Band. There should be an E & A role in advising Indian technical staff or in carrying out:

a) physical planning of communities;

b) establishing technical by-laws respecting zoning and physical facilities;

c) developing appropriate technology.

In general if federal funds are involved there will be the core E & A role to be performed with respect to the Department's Program responsibility.

Maintenance - Band Operated Schools and Other Facilities

The E & A Branch in cooperation with Regional technical units is developing a maintenance management system that is based on a properly recorded capital assets inventory.

Assuming that maintenance should be at a level to stay within a controlled rate of depreciation and that facility investment and management should optimize life cycle costing and operational efficiency the Regional and District E & A role and responsibility should include:

a) The provision of technical advice where it is not practical to obtain it from private enterprise.

b) The establishment of maintenance standards to be met and, assistance in determining the necessary maintenance systems and procedures where appropriate.

c) The Review of Band maintenance proposals.

d) Band Technical Training in the maintenance and operation of facilities.

e) Technical evaluation of facility operation.

Housing, Arenas etc.

Approximately 2300 houses will be constructed on Indian Reserves this year and the Indian Affairs Program budget is in the order of 39 million dollars. The E & A role in the housing program on Reserves varies from no involvement in some cases, to a detailed involvement of providing plans, ordering material, providing training and actually supervising construction. Generally, however, the E & A role in housing has been minimal with no clearly defined involvement.

During a recent study of Indian housing it was found that the life expectancy of the average Indian house was about 25 years, assuming two major renovations during that period. Although it is possible to build minimal shelter in some parts of Canada for the subsidy of $12,000, the average Indian house costs closer to $30,000. Due to this situation then, the elements of many Indian houses are cut to bare essentials and often shortcuts are taken at the expense of proper construction. In the past, Central Mortgage and Housing Corporation have been inspecting Indian houses that have received C.M.H.C. financing. The recent disengagement of C.M.H.C. from the inspection function together with recently announced cutbacks for that organization likely means that if Indian houses are to be inspected that work will have to be carried out by Departmental technical staff.

If an adequate technical input is to be ensured, an increase in Region and District E & A involvement is necessary. The report describing a study of the Ontario Indian Housing Council recognizes that Band technical training is essential and that technical advice and assistance be provided from Regional E & A, rather than local government.

E & A role should include:

a) The evaluation of housing proposals.

b) The determination of specific terms and conditions of housing contribution arrangements.

c) Project inspection, similar to the role played by C.M.H.C. where their funds were involved.

d) Technical advice.

The E & A role should extend to the detail necessary depending on the needs of the Band. Local experts in house construction should be employed wherever practical to minimize detailed involvement of E & A staff.

WORKLOAD DIAGRAM

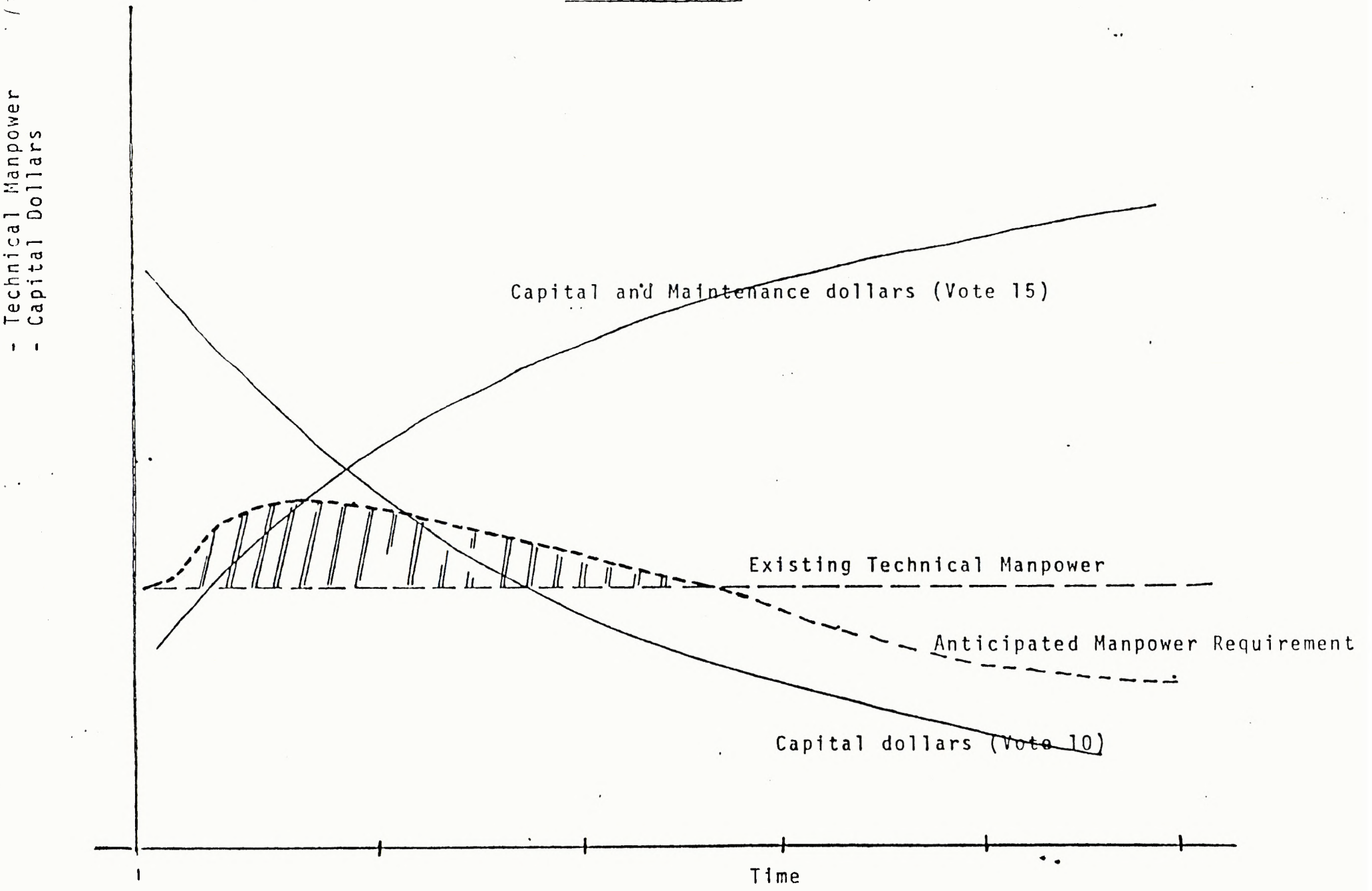


FIGURE 1

ALBERTA REGION

ANNEX - ALBERTA

June 4, 1979

E&A FUNCTION & ORGANIZATION

- ALBERTA REGION -

This section, dealing with the Alberta region, is an annex to the General Report.

Many of the observations and much of the data used in the report were obtained from discussion with Region and District E&A staff, the Director, E&A, the R.D.G., the Director of Operations, the District Manager, Calgary, and other Indian and Inuit Affairs Program staff in Alberta.

ALBERTA REGION - AN OVERVIEW

The Alberta region provides program services to approximately 35,000 Indians of 42 Indian Bands. Approximately 26,000 of these live on reserves.

There are seven Districts in the Alberta region:

Blackfoot-Stoney Sarcee (Calgary)

Blood-Peigan (Lethbridge)

Edmonton-Hobbema (Edmonton)

Fort Vermillion (High Level)

Lesser Slave Lake (High Prairie)

Saddle Lake-Athabasca (St. Paul)

Fort McMurray (Ft. McMurray)

The annual budget for the acquisition of physical facilities is in excess of 17.3 million dollars and the facilities maintenance budget is over one-half million dollars. In addition, about 5 million dollars in DREE funds is to be made available over a 5 year period for community improvement work.

Approximately 12 million dollars of Vote 15 is for capital works and is transferred to the Bands through contribution arrangements. Approximately one-half of the facilities maintenance budget is also transferred to bands with the other half retained by the Program for maintenance work to be carried out by E&A staff.

Some Alberta Bands have considerable Band funds, as compared to most Indians in Canada. The Hobbema Bands requires no technical support service because of their financial status and because of the knowledge

and skill that they have to provide these services to their own communities. With some Bands, there is a move towards hiring their own engineer. For example, the Stoney Band have employed their own engineer and the Blood Band is considering a similar arrangement.

The requirement for technical services varies considerably within the region, depending upon the degree of independance that individual Bands have in technical matters, and the nature and scope of the technical activity.

There are 3 Tribal councils being developed in Alberta with a trend for these to take over District operations in geographic areas. This is expected to take place for Lessor Slave Lake, Saddle Lake, Athabasca and, Fort Vermillion. It is understood that there are 11 E&A man-years being considered for transfer to these tribal organizations.

During the course of the study and from discussions with the Director General, the Director Operations and the District Manager, Calgary, it was clear that they recognized and supported the need for a strong technical capability in the region. Regional management stated that in the short term,

considerable technical support should be given to Bands with a particular emphasis on training. At the same time however, regional management want an orderly withdrawal from Program E&A support to Vote 15 projects, as Bands are ready for it. Over the longer term, after trust is developed, and skills are acquired by Bands, the E&A role should be a regulatory role. Senior regional management said that they do not want a highly visible role in housing yet they recognize the need for E&A input into housing so as to achieve a reasonable standard of quality.

THE PROGRAM FORECAST

Table 1 is an analysis of the 1979/80 capital forecast submitted by the region in September 1978. Although the actual 1979/80 budget figures differ, the table shows a fairly realistic breakdown of the types of construction projects. Table 1 includes the capital items of both Vote 10 and Vote 15.

Table 1
Capital Forecast Summary 1979/80
(In thousands of dollars)

FACILITY TYPE / ORGANIZATION UNIT	BUILDINGS					UTILITIES						
	EDUCATION	HOUSING	OTHER	SUB TOTAL - BLDG	TRANSPORTATION	WATER	SEWER	ELECT.	SUB TOTAL - UTIL.	GROUNDS	OTHER	TOTAL
Reg. Office	2118	6,186	55	8,359	180.2	70.6	220.6	11.2	302.4	178	308.8	9,328.4
Blackfoot, Stoney Sarcee	1108		550	1,658	470	230	175	20	425			2,553
Blood/Peigan	460			460	350	333	332		665		85	1,560
Edomonton-Hobbema	725		315	1,040	30	297	233.5	38	568.5		186.5	1,824.9
Fort Vermillion	912			912	0	190	150	30	370			1,282
Lesser Slave	305			305	374.2	260.7	260	103.2	623.9	100		1,403.1
Saddle Lake	1,575		200	1,775	1,312.2	270	320	442	1,032			4,119.4
Total	7,203	6,186	1,120	14,509	2,716.6	1,651.3	1,691.1	644.8	3,986.8	278	580.3	22,070.7

Table 2 is also an analysis of the September 1978 program forecast for 1979/80 and shows the number of projects in groups of size by dollar value. Table 2 does not include housing.

Table 2

Project Size

(No. of Projects)

Project Expenditure	No. of Projects (1979/80)
Less than $50,000	79
$50,000 - $100,000	37
$100,000 - $250,000	33
Over $250,000	14

clear need for more engineering input by E&A staff particularily in program planning, value engineering and project management.

Project Control

Project control systems and procedures are quite effective and well understood in Alberta. Once the budget was approved, project managers were named and technical standards were systematically established by the Director E&A for capital contribution arrangements. E&A objectives were established for the year and a work plan was determined. Nearly all funds, except education capital, for the acquisition of physical facilities, were identified in Vote 15 and transferred to Bands.

In examining the list of projects to be carried out by Bands through Vote 15, there appears to have been little consideration given to the Bands desire or technical experience and ability to carry them out. To a large extent, projects that are transferred to Bands through contribution arrangements remain with E&A to implement. In discussing his role, one area engineer explained
that he did everything for a Vote 15 project that would need to be done for a Vote 10 project plus

CAPITAL MANAGEMENT

The Director E&A is a member of the senior management team in the Region and represents the E&A point of view at regular senior management meetings. He appears to have an excellent working relationship with his colleagues in Finance, Contract Admin., Education and Local Government etc. In Alberta, all Responsibility Centre Managers are located in the Regional Office which in some respects, simplifies the administrative procedures in project management.

Mr. Wayne Wells, District Manager, Calgary explained that it is going to take Indians a few more years to really understand the engineer's role in project planning and implementation and that at the present time Indian Bands are still operating by crisis management. He suggested that E&A has to be flexible but there was a clear need for more engineering input by E&A staff particularly in program planning, value engineering and project management.

Project Control

Project control systems and procedures are quite effective and well understood in Alberta. Once the budget was approved, project managers were named and technical standards were systematically established by the Director E&A for capital contribution arrangements. E&A objectives were established for the year and a work plan was determined. Nearly all funds, except education capital, for the acquisition of physical facilities, were identified in Vote 15 and transferred to Bands.

In examining the list of projects to be carried out by Bands through Vote 15, there appears to have been little consideration given to the Bands desire or technical experience and ability to carry them out. To a large extent, projects that are transferred to Bands through contribution arrangements remain with E&A to implement. In discussing his role, one area engineer explained
that he did everything for a Vote 15 project that would need to be done for a Vote 10 project plus

the extra work of close liaison with the Band. Generally, Program E&A have a high credibility level with Bands and Bands view them as a free engineering service. In most cases, Bands dislike the idea of paying consulting fees from their capital funds. Within this framework, however, Program E&A staff use the services of consultants and DPW to good advantage within cost-effective limits.

Of the 42 Bands in Alberta, it is estimated that only 5 have demonstrated the willingness and the technical capability of taking on capital projects with no operational help from E&A. Approximately another 15 Bands may have the capability but feel that they should not pay for engineering services from their capital monies or, they think that engineering input is not necessary. Approximately 15 others, with a good training program, should be able to take over the technical implementation role within 2 or 3 years. The remaining 7 Bands require considerably more organization ability, skill and knowledge and, full program E&A support will be required for a number of years.

Local labour projects

A number of projects have been constructed by local labour arrangement in the past few years, including some large schools. These have created Indian

employment and have been successful trade skill training projects. They have required a significant E&A manpower input and the overall success of these projects have been in direct porportion to this program E&A investment. Most local labour projects have lacked a proper running cost control. Computer statements have been of no cost control value and suitable manpower was not available to maintain a proper manual cost control record. Attempts to use capital man-years for the purpose were not successful as the bureaucracy of the classification and recruiting system did not recognize the required level of pay and the hiring flexibility needed to compete in the industry.

BAND TRAINING

During the course of the study in Alberta, Program Managers and technical staff emphasized the need for Band technical/management training. Over the past number of years, the Program has carried out considerable training in Education, Economic Development, Finance and Local Government. For example after many years of finance training in accounting procedures etc., it is only now that some Bands are beginning to understand financial accountability and the value of financial control.

Local Government staff have carried out workshops and seminars to acquaint Indians with the philosophy and practices in Government administration. The same has been done with respect to education, administration and economic development but little has been done in technical training other than limited training in some trade skills.

If Vote 15 is to be successful, there must be a technological transfer as well as a dollar transfer to Bands. Even with optimum use of engineering and architectural consultants, most Bands need to learn considerably more about project technical planning, contract administration, and construction management to successfully operate in the highly competitive, profit motivated construction industry.

MAINTENANCE MANAGEMENT

At the present time, there is no co-ordinated maintenance management system in Alberta, and, there is no comprehensive inventory of capital assets and therefore submissions for funds cannot be properly supported. With the assistance of the E&A Branch in Ottawa, the Region is carrying out a pilot

maintenance management study with a view to establishing;

- an assets inventory with proper as-built records;
- maintenance standards and guidelines;
- maintenance management systems and procedures.

FIRE PREVENTION

There are three technical staff in the Fire Prevention and Construction Safety section of the Regional Office E&A Unit. Their fire safety program this year includes extensive fire prevention training on many reserves; the arrangement of a number of fire prevention agreements with neighboring communities and the acquisition and inspection of numerous fire protection installation and pieces of equipment.

PHYSICAL PLANNING

As a result of demand for service, the Regional E&A Unit has established a physical planning section. This unit of three surveyors and one physical planner, concentrates on the preparation of site record drawings and the analysis of land opportunity

and restraints concerned with physical development only and dealing with topography, drainage, soil classification, vegetation and exposure etc. They confine their activities to core development areas and do not extend their work into the creative stage of producing land development proposals. Consultants are used to do the development work.

CONTRACT ADMINISTRATION

The contract administration function for all types of contracts is carried out in the Finance and Admin. Unit in the Regional Office. For professional consultants and construction contracts, the technical content is provided by E&A. There is a close working relationship between them and the E&A Unit with E&A staff having their necessary input into technical consultants and construction contracts. This organization arrangements causes no problems and construction contracting by this arrangement appears to be sound and appropriate.

E&A ROLE IN HOUSING

The housing subsidy program in Alberta is over 6 million dollars and the as constructed cost of constructing new houses each year considerably

exceeds this amount. Although Regional Office E&A staff have limited involvement, District E&A staff spend approximately 8 man-years in technical service to Indian Bands in support of their house construction activities. This E&A support service includes preparing housing sketches; preparing bills-of-materials, providing general advice and, in the actual construction of houses. This involvement represents one Program E&A staff man-year for every 64 housing units constructed or, 13% of the total E&A manpower in the Region is used for housing. Even so, additional technical involvement would help to eliminate some poor building practices being followed.

C.M.H.C. have now informed the Region that they will no longer carry out the inspection of houses on Reserve that receive C.M.H.C. funding. These inspections have had valuable pay-off in construction quality and if the equivalent role is to be played by Program E&A staff, additional staff will be required.

MANPOWER UTILIZATION - Alberta Region

Existing E&A Organization

At the time of the study, there were 59 man-years approved to carry out E&A activities in the Alberta region. Approximately 53 of these psoitions were filled.

The existing E&A manpower is:

Regional Office	-	10 Engineers
(Including Area Engineers)		2 Architects
		11 Technologists
		2 Admin
		1 Secretary
		26

Three of the ten engineers on staff of the Regional Office, are area Engineers. One is located in the southern part of the Province to serve the southern Districts, one is located in the North and the third area engineer serves the central districts.

Saddle Lake - 1 Technologist
2 Construction Supervisors
3 Maintenance Craftsmen
6

Edmonton Hobbema - 6 Maintenance Craftsmen

Ft. McMurray - 1 Technologist
2 Maintenance Craftsmen
3

Blood/Peigan - 1 Technologist
2 Maintenance Craftsmen
3

Blackfoot/Stoney - 1 Technologist
6 Maintenance Craftsmen
7

Fort Vermillion - 1 Technologist
1 Construction Supervisor
5 Maintenance Craftsmen
7

Lessor Slave - 1 Construction Supervisor

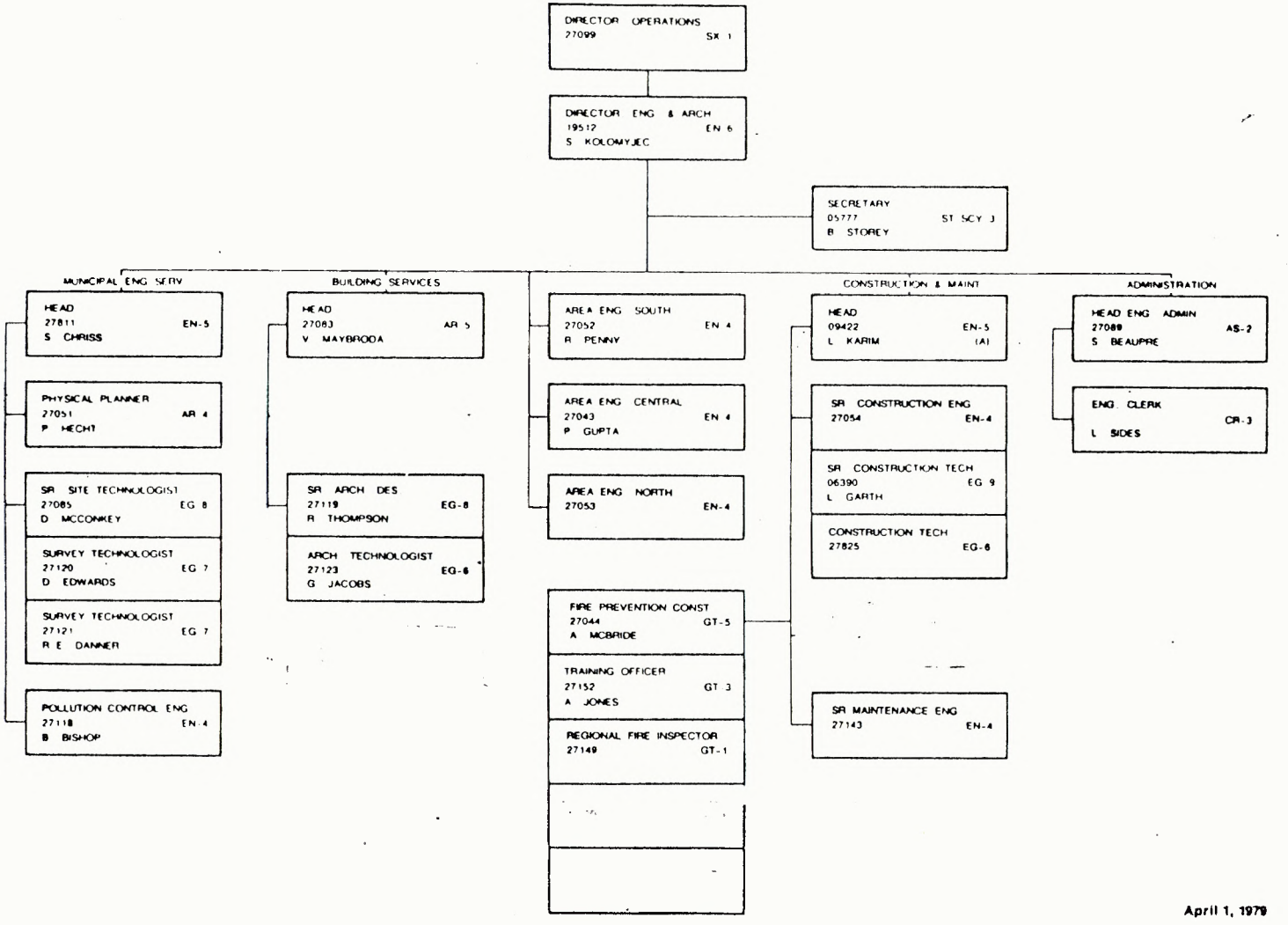
Therefore: Regional Office - 26 Man-years

Districts - 33 Man-years

Total = 59 Man-years

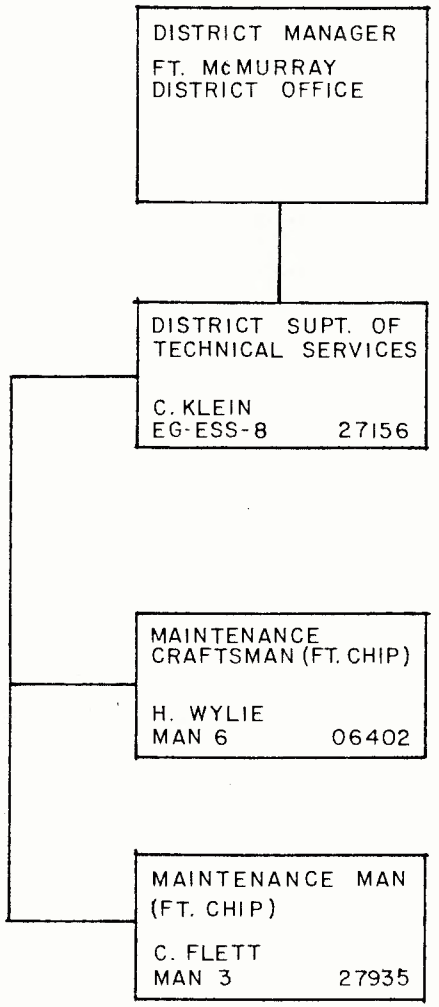
ALBERTA
Indian & Inuit Affairs
Regional Technical Unit

NO. AUTHORIZED
MAN-YEARS 26



April 1, 1979

FT. McMURRAY DISTRICT 1979/80 702
ENG. & ARCH.



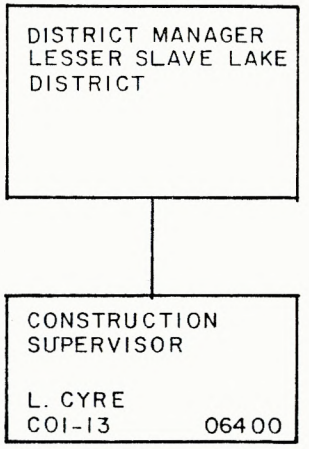
1979/80 - 3 STAFF YEAR

AREA ENGINEER
RAMESH GUPTA
POSITION 27043

LESSER SLAVE LAKE DISTRICT ENG. & ARCH.

1979/80

777

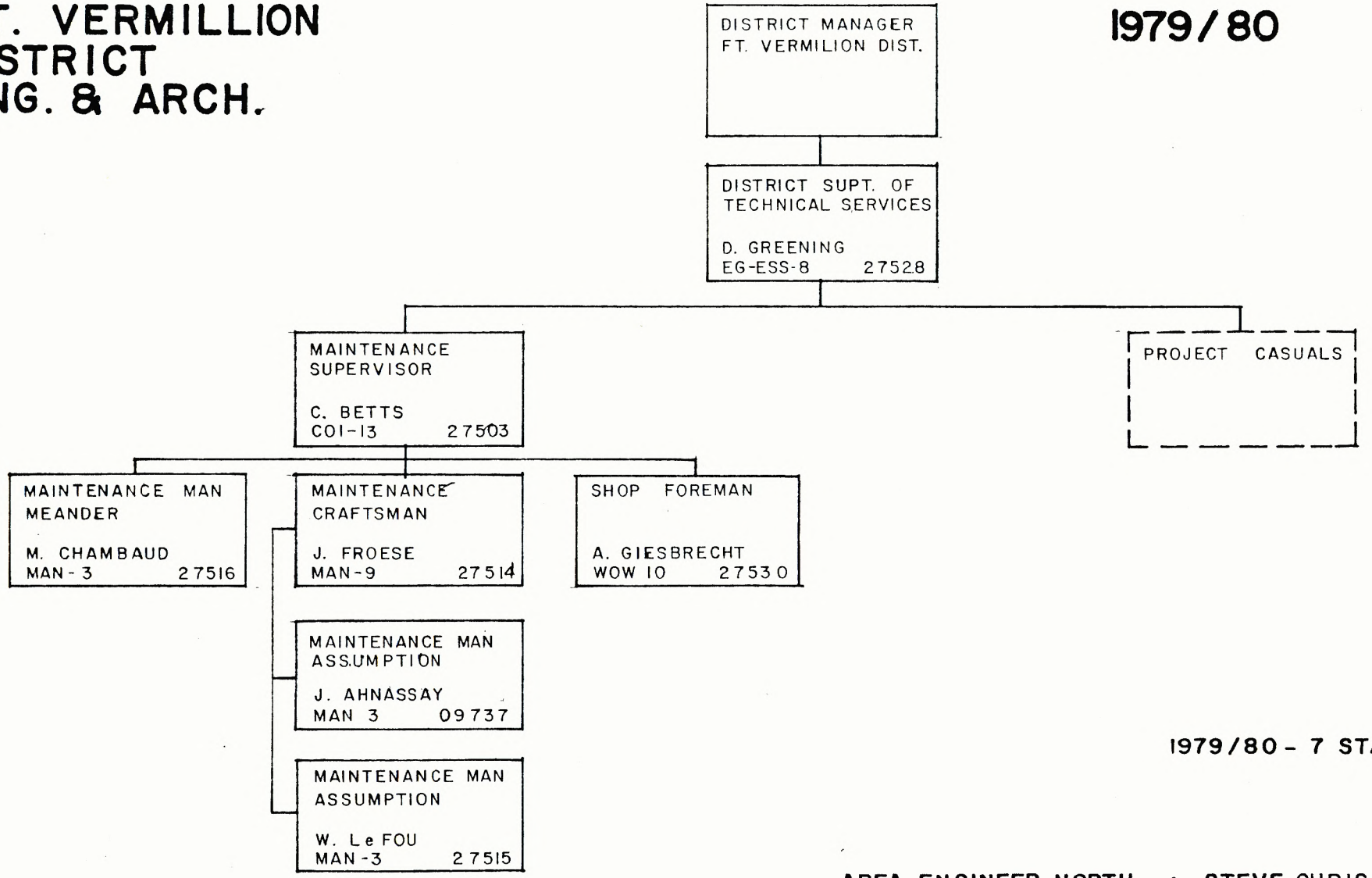


1979/80 - 1 STAFF YEAR

AREA ENGINEER NORTH : STEVE CHRISS
ENG 4
POSITION 27053

FT. VERMILLION DISTRICT ENG. & ARCH.

1979/80 775



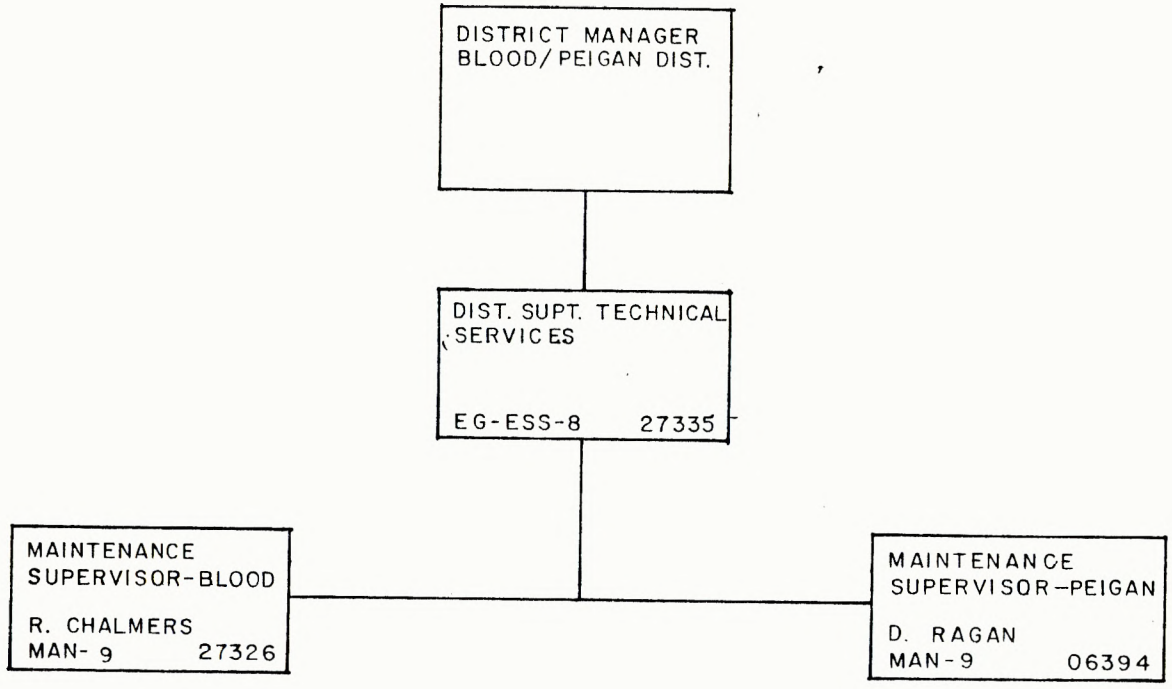
1979/80 - 7 STAFF YEARS

AREA ENGINEER NORTH : STEVE CHRISS
ENG 4
POSITION 27053

BLOOD / PEIGAN DISTRICT ENG. & ARCH.

1979/80

773

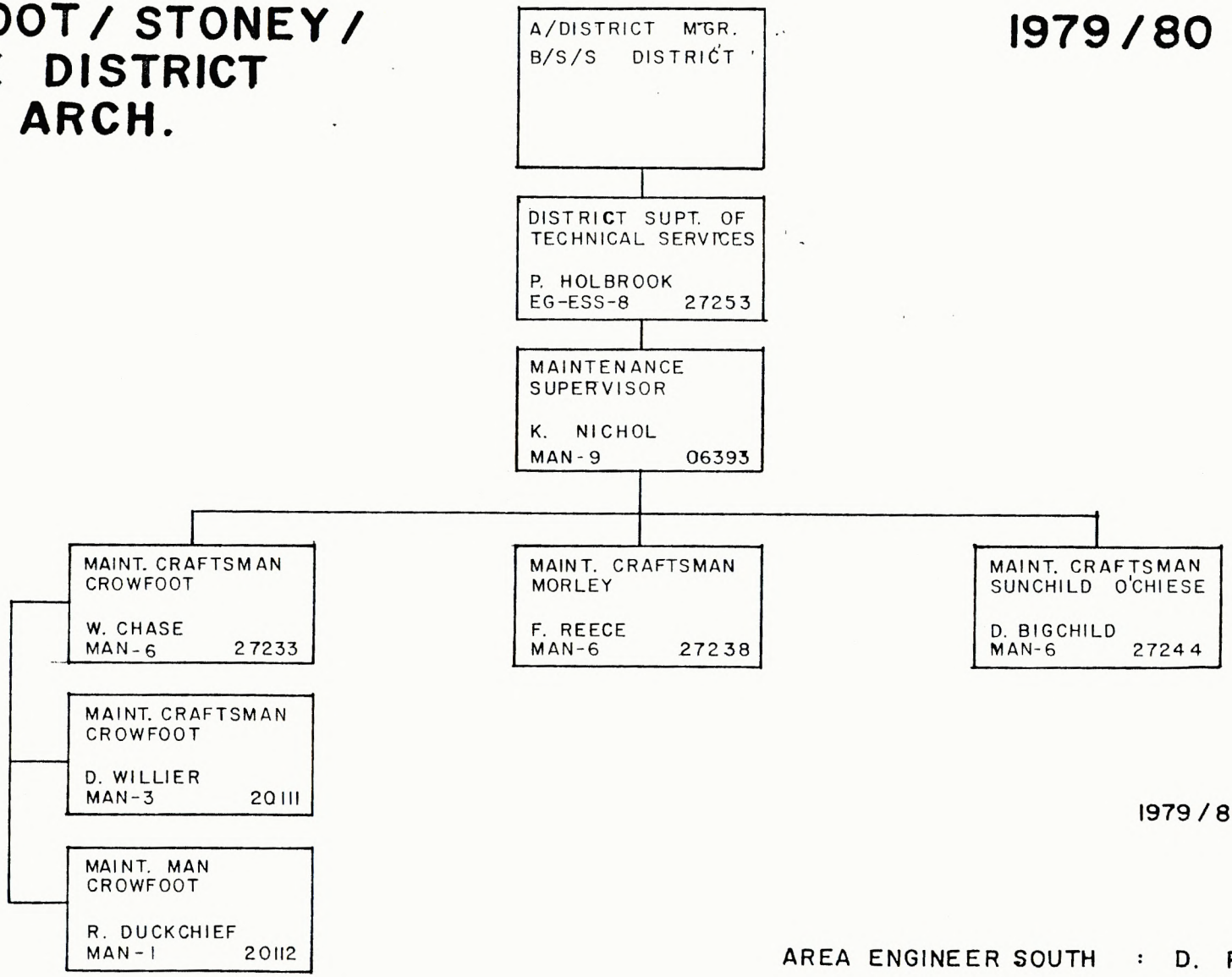


1979/80 - 3 STAFF YEARS

AREA ENGINEER SOUTH : R. PENNY
ENG 4
POSITION 27052

BLACKFOOT / STONEY / SARCEE DISTRICT ENG. & ARCH.

1979/80 772



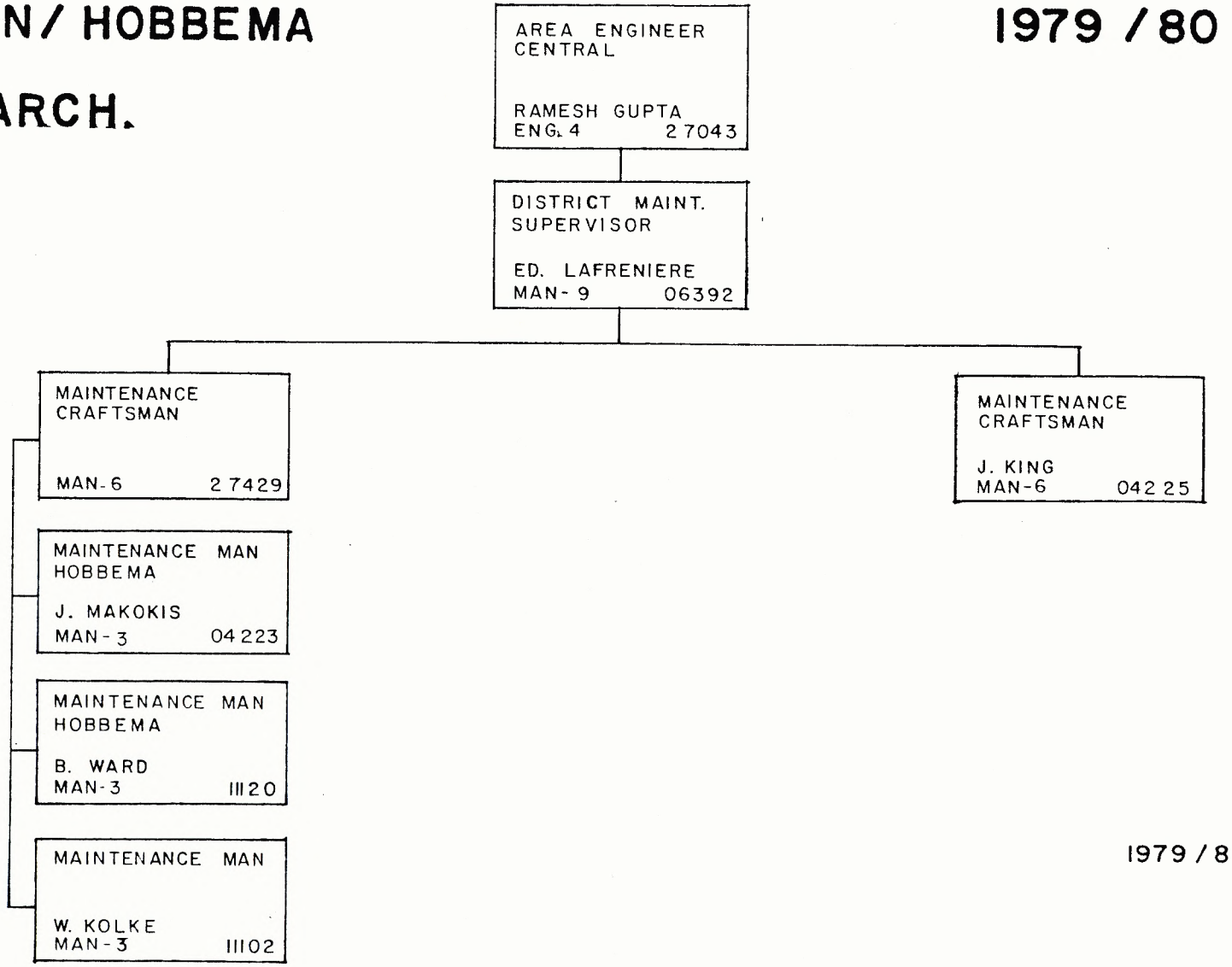
1979/80 - 7 STAFF YEARS

AREA ENGINEER SOUTH : D. PENNY
ENG 4
POSITION 27052

N. B. AGREEMENT WITH A/DISTRICT MANAGER THAT R. PENNY WILL ASSUME FULL TECHNICAL RESPONSIBILITY FOR B/S/S DISTRICT

EDMONTON/ HOBBEMA DISTRICT ENG. & ARCH.

1979 / 80 774

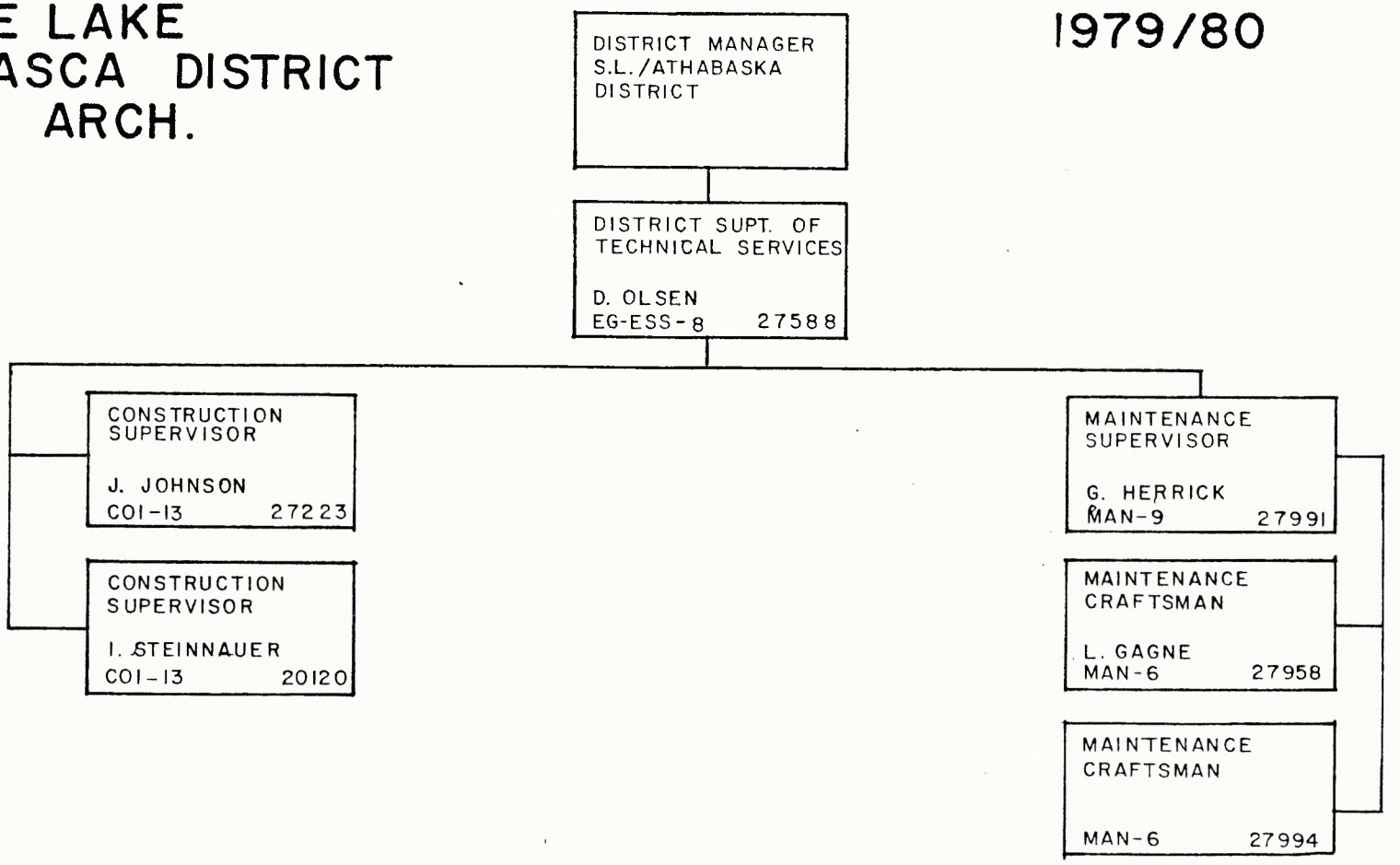


1979 / 80 - 6 STAFF YEAR

SADDLE LAKE ATHABASCA DISTRICT ENG. & ARCH.

1979/80

779



1979/80 - 6 STAFF YEARS

AREA ENGINEER CENTRAL : R. GUPTA
ENG 4
POSITION 27043

Workload Analysis

The 1979/80 workplan, prepared by E&A technical staff in Alberta indicates a manpower workload of approximately 60 man-years. The workplan is a detailed breakdown of known projects and assignments with an estimate of time to carry them out.

An analysis of the workplan shows a maintenance workload of 20 man-years. This recognizes that Indian Bands carry out about 50% of the maintenance workload and require about the same amount of manpower. These 20 man-years represent about 33% of the total E&A workload in the region. Approximately another 5 man-years of maintenance craftsmens' time and 3 man-years of technologists' time is spent on housing. The maintenance and housing workload therefore consumes 28 man-years or nearly 50% of the total technical manpower on regional staff.

Three of the total E&A man-years are utilized in fire prevention and construction safety which is not directly related to the size of the capital program. In addition, another three of the fifty-nine total are utilized in physical planning which as well, is not directly related to the capital or maintenance program.

Based on the Regional workplan the workload breakdown is approximately:

Maintenance -	20 man-years
Housing -	8 man-years
Fire prevention -	3 man-years
Physical planning -	3 man-years
Management and Admin. -	4 man-years
Core function and project implementation -	29 man-years
	60 man-years

Approximately 29 man-years (shown above) are allocated in the workplan for project implementation and core function activities. Although much of the construction budget is in Vote 15, a large part of the workload of implementing the projects remains with Program E&A and is charged to these 29 man-years.

The following is a theoretical analysis of the E&A workload in Alberta based on the size of the capital and maintenance program and using the adjusted manpower resource formula which is described in the General report. The extra maintenance workload in the Districts and the extra manpower requirements for physical planning and fire prevention are not

included in the application of the formula and are added separately.

By formula calculation:	Engineers -	8	
	Architects -	3	
	Technologists -	21	
	Admin. -	4	
		36	man-years

plus:

Physical planning;	1 - Architect 3 - Surveyors	4	man-years
Fire prevention;	3 - Technologists	3	man-years
Maintenance Craftsmen in Districts		19	man-years
	Total =	62	man-years

Note: The above calculations account for 50% of all maintenance work being carried out by Program E&A staff; a manpower workload of 8 man-years in support of Indian housing and, an equivalent E&A workload for Vote 15 capital projects as would be required for Vote 10 projects.

Comparison - Alberta and Other Regions

The following table compares the E&A manpower in each Region.

	Approved C.F.T. Man-years			Approx. size of Capital Program		
Region	Regional Office	Total in Districts	Total in Regions	Vote 10	Vote 15	Total
Atlantic	8	5	13	1.7	3.6	5.3
Quebec	23	22	45	7.8	10.9	18.7
Ontario	16	22	38	10.0	17.1	27.1
Manitoba	31	7	38	9.7	7.5	17.2
Sask.	11	22	33	13.4	6.1	19.5
Alta.	26	33	59	4.1	11.7	15.8
B.C.	30	23	53	8.2	13.2	21.4
Yukon	5	-	5	0.2	2.6	2.8

The number of E&A man-years in Alberta is substantially greater than the average of other regions in relation to the size of the capital program. Of the Alberta total,

however, approximately 50% is applied to maintenance and housing which is a greater percentage than experienced in other regions.

Area Engineers in Alberta

At the time of the study there were three area Engineers, one serving the southern Districts, one the central Districts and another the northern Districts. Consideration was being given to changing this arranagement to provide a District Engineer in Lethbridge and a District Engineer in High Level to serve the Ft. Vermillion District. These District Engineers report directly to the District Managers. One area engineer would remain to serve Saddle Lake; Athabasca District and the Edmonton District.

APPENDIX "A"

TERMS OF REFERENCE

General Objective

A study team shall examine and report with recommendations on the activities, functions and organizations of regional and district technical units in relation to their ability to ensure that new physical facilities are effectively and economically procured and that existing assets are properly maintained.

Study Team

The study team will have the following membership:

1. Cliff Crapper, Chairman
2. Bill Clevette
3. Bob Holloway (Manitoba Region)
4. Gregor MacIntosh
5. Bill Elliott (Management Services)

General Information

Organization and organization development is a continuing process in Indian and Inuit Affairs. Any study of the Regional and District technical function and organization must recognize:

a) The difference in the nature and size of the technical workload in each Region and each District;

b) The diversity of need, attitude and objectives of Indian Bands in the various Regions;

c) The differences in the operation and delivery system in Region; some having District organizations and some not.

d) Priorities given skill training, Indian employment and Indian involvement; and

e) New management systems and procedures as well as other influences:

i) B.C.S.

ii) Capital Management

iii) Project Management System

iv) Maintenance Management

v) Financial restraints

vi) The SPICE report

vii) Other evaluation reports.

f) The Department's responsibility and accountability for Band administered capital projects.

Principles

The following are basic principles as a guideline in considering the E & A functions and organizational structure:

1) The objectives of Regional and District E & A Units is to ensure quality, efficiency and effectiveness in the acquisition and maintenance of physical facilities and as well, in the development and maintenance of a Regional Fire Prevention Program.

Integral with this is:

- the creation of Indian employment opportunities;
- Indian skill training;
- Indian involvement and the development of Band Government.

2) It is a basic principle in working toward the above objectives, that Engineering, Architectural and Technical Function be carried out as close to Band level of management as practical and feasible, yet with due regard for cost effectiveness and efficiency.

3) The Director, Engineering and Architecture in each region, is responsible and accountable for the technical implementation of all capital projects in the regional capital plan. This is not to say that he will make or approve all technical decisions, as he may delegate this responsibility to his staff or to District technical staff. Also, this responsibility and accountability is in no way intended to subtract from the established responsibility and accountability of the Program Responsibility Centre Manager. In cases where funds and capital projects are transferred to Indian organizations, the Director, E & A or his appointed designate, shall ensure that such agreements include the technical mechanisms of accountability.

   In accordance with F.D. #5 and F.D. #14, with regard to the management of capital projects, an Engineering and Architecture project manager will be appointed by E & A.

4) It is a principle that for his judgement and advice to be of best value, a professional engineer or architect practicing in a political environment, must remain technically objective. Within health and safety limits, however, the Responsibility Centre Manager may properly make decisions based on non-technical factors, that are not consistent with technical judgement. The engineer in these cases is expected to make clear, the technical consequences of such decisions, but then to work towards the overall objectives established.

5) There are core functions that must be carried out at Regional or District level. As well, there are operational functions that may be carried out by the Region; by the District, or by the Indian Bands. Districts (where they exist) are the operational centres with Indian Bands.

6) Optimum use should be made of private consultants and central service organizations, such as D.P.W.

Scope and Methodology

The scope of the study shall include: role, systems and procedures, organization structures and manpower

resources in relation to the Engineering and Architectural function.

The study team shall recommend, where necessary, corrective measures with respect to role, systems, procedures and organization to ensure the adequate delivery of the capital and maintenance programs.

Role - The existing role and activities of regional and district technical units shall be examined in the context of the stated E & A function, for the purpose of commenting on the quality, cost effectiveness and operational efficiency in the planning and implementing of capital works.

Systems and Procedures - The systems and procedures used in planning, developing and implementing the capital and maintenance program shall be examined with respect to accountability, as well as operational efficiency and effectiveness. They shall also be examined in relation to established management systems and operating directives.

Organization - The study shall include an examination of region and district technical organization structures and shall take into account changes or realignments that are necessary to adequately reflect any changes in Program direction and accountability.

Manpower Resources - With recognition of the principles stated and the described functions, the study shall include a quantitative and qualitative analysis of the manpower resources required in District offices and Regional offices, to carry out the functions.

The study shall within practical limits, establish manpower resource guidelines (standards) which will assist in equating manpower need to function and workload. These standards or guidelines will resemble those measurements used for the same purpose in private industry.

The study team shall examine the utilization of Capital Man-Years C.F.T. man-years and E & A Branch support (and a combination of these) to ensure the adequate delivery of the capital and maintenance program.

Other - Recognizing the differences in the nature and size of the technical workload and the differences in the operation and delivery system in each Region, the report where appropriate, will separately identify the observation and recommendations for each Region.

The study team shall meet with regional and district technical staff, as well as regional and district program management staff, to obtain data and to discuss their general observations and findings.

The study team shall also study and report their recommendations, in the E & A responsibilities with regard to schools and community facilities (e.g., Band operated schools and facilities, and others) as they should be to ensure adequate technical input and technical accountability. The report shall also discuss what the E & A role should be vis-a-vis Indian housing, as well as other facilities, such as Band offices, arenas, etc.

FUNCTIONS - Regional and District E & A Units

Some of the most important E & A functions are carried out with multi-discipline team involvement. Indian Bands, planners, finance officers, responsibility centre managers, etc., may all have some impact, within their own role and responsibility, on the capital and maintenance program.

The following functions of the E & A units are separated into the two categories of Core Function and Operational Function. The core function relates to program development and management and cannot be readily delegated to Bands. The operational function relates to the planning and implementation of projects. The operational function could be delegated to Districts or Bands or could be carried out by the Regional Office, E & A Unit for reasons of efficiency and/or because of technical complexity and the need for technical specialist input.

Core Function

Contributions to Region and District Management and Program Planning

(a) Collaboration on the Regional/District Management team in:

- the development of Regional/District objectives, thrusts and goals;

- analysing community improvement accomplishment and continuing needs;

(b) Provision of the technical input in the planning and development of regional/district capital and maintenance programs, including the technical input into the preparation of the budget estimates and program forecasts:

- data gathering and analysis

- cost/benefit studies

- the analysis of alternatives

- cost estimating

- attesting to the technical feasibility and technical soundness of proposals prepared by others;

(c) The preparation of, or the provision of technical data for preparation of, Treasury Board submissions and other submissions of authority;

(d) Preparing and analysing capital management reports.

Advisory/Consulting Service

(a) Provision of professional and technical advice to the staffs of the Regional Office, Districts and Bands in various specialist disciplines in Engineering and Architecture;

(b) Representation of the Region interdepartmentally, as well as with other levels of government, private organizations, industry and consultants on all technical matters.

Quality Assurance

(a) The performance of a functional review and evaluation of capital design, construction and maintenance activities to ensure an acceptable level of quality and to measure efficiency and effectiveness;

(b) The preparation of articles of agreements with Bands with respect to capital and O & M contributions for the acquisition and maintenance of facilities. Also, monitoring, inspecting and reporting on work quality programs.

(c) Contribution to the development of standards and guidelines;

(d) Development of regional technical procedures and systems.

Miscellaneous Professional/Technical Services

(a) Provision of Regional co-ordination of certain national programs (e.g., metric conversion, energy conservation, etc.);

(b) The organization, staffing, training, promotion, appraisal and evaluation of technical staff who are engaged in the E & A function;

(c) The development and maintenance of a Regional capital assets inventory;

(d) Co-ordination of Regional requirements for aerial photography, mapping and cartography;

(e) Development of technical specifications for specific vehicles, fixed and mobile equipment; etc.;

(f) The development of a regional fire protection and construction safety program;

(g) General technical development (innovations).

Training

(a) Organization and implementation of Band technical skill training, as well as construction and project management training in such areas as:

- building technology
- contract administration
- construction inspection
- engaging consultant and consultants' terms of reference
- the planning and management of projects
- codes and regulations in the industry

Operational Function (Project Planning and Implementation)

Consulting and Advisory Service

(a) Provision of professional and technical advice to Indian Bands in various specialist disciplines in the planning, design, construction and maintenance of physical facilities.

Project Design and Construction

(a) Preparation of project implementation plans:

- technical data collection and analysis
- feasibility and cost studies
- physical planning
- development of statement of requirements

(b) The management of project implementation (project management) carried out by Department:

- in-house design
- appointing consultants or D.P.W.
- preparing terms of reference
- coordinating input of various disciplines
- contract administration
- cost estimating and cost control
- construction management, either contract or day labour
- handover inspections
- reporting

Facilities Maintenance

(a) Organizing and carrying out the maintenance of capital facilities;

(b) Preparing terms and conditions for maintenance agreements with Bands, followed by inspection and evaluation of quality and effectiveness.

Miscellaneous Professional/Technical Service

(a) Implementation of fire prevention and construction safety programs;

(b) Collaboration in the development and execution of on-the-job technical skill training programs (carpentry, masonry, etc.).